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COMMONWEALTH OF AUSTRALIA.

PATENT SPECIFICATION

15,410/62

Complete Specification Lodged ..... 15th March, 1962.

Application Lodged (No. 15,410/62) ..... 15th March, 1962.

Applicant..... Imperial Chemical Industries of Australia and New Zealand Limited.

Actual Inventors..... Christopher Frederic Austin and Eric Swainson.

Convention Application.
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DIV. 350

Complete Specification Published ..... 19th September, 1963.

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Classification 43. 9.

International Classification A 44 b.

Drawing attached.

COMPLETE SPECIFICATION.

IMPROVEMENTS IN SLIDE FASTENERS.

The following statement is a full description of this invention, including the best method of performing it known to us:-

This invention relates to slide fasteners of the kind comprising a pair of tapes each provided with a series of teeth, a slider arranged to be movable along the tapes and take the teeth on the respective tapes into and out of engagement with one another, and top and bottom stops provided on the fastener to prevent removal of the slider. Such fasteners will be referred to herein and in the appended claims as "fasteners of the kind referred to".

The principal object of the present invention is to provide a new method for manufacturing such fasteners continuously.

Accordingly the present invention provides a method of manufacturing slide fasteners of the kind referred to which comprises assembling continuous toothed tapes together with the teeth engaged, cutting apertures in the assembled tapes at each of a number of positions along the tapes, each aperture extending over a number of the engaged teeth and being large enough to permit a slider to be inserted therein, inserting at least one slider in each aperture and mounting the same on the teeth and securing plastic material to the tape in the vicinity of the apertures either before the said apeture-cutting or after mounting of the slider.

The plastic material prevents fraying of the tapes. The plastic material may also form top and/or bottom stops and end reinforcements on the tape; but as an alternative,

metal top and/or bottom stops may be subsequently attached.

The expression "continuous tape" means a tape at least as long as will enable two fasteners to be cut therefrom; but of course as a practical matter the tape will be indefinitely long and permit a large number of fasteners to be cut from it; since, as stated above, continuity of manufacture is the principal object to be attained. In practice, the method is intended to be used substantially continuously, that is using tapes in the longest practical lengths with the operations of assembling, cutting apertures, sliding and forming stops, being carried out simultaneously at different points along the tapes.

The step of securing plastic material to the tapes may be performed before cutting out the apertures or after mounting of the slider. If the first alternative is employed the cutting is made easily and there is no possibility of fraying of the cut tape. The tops of the fasteners have to be split longitudinally to permit mounting of the slider and top stops are preferably secured in a separate operation after mounting of the slider. It is possible, however, to form top stops in the same operation as applying the plastic material or as a separate operation immediately before mounting the slider provided that the end stop is of a type which will part through the slider one way to permit the slider to be mounted on the teeth but not the other way. For example the top stops may be of wedge-shaped resilient material with the thin end of the wedge being directed into the aperture.

If the plastic material is secured to the tapes after the slider has been mounted, the end stops most conveniently formed in the same operation as securing of the plastic material and this may be done by moulding the plastic material and the end stops on the tapes together. The plastic material may be secured to both upper and under surfaces of the tapes or to one surface only. It is conveniently moulded on so as to impregnate the tapes with plastic material and thus form a secure bond.

If the apertures are pitched apart along the tapes at intervals equal to the lengths of the desired fasteners, one slider will be inserted in each aperture, but if the intervals are equal to the length of two fasteners, then two sliders will be inserted in each aperture head-to-head so as to produce the fasteners in pairs lying top-to-top.

If two sliders are assembled in each aperture, then each length of tape between apertures represents two fasteners, and a pair of bottom stops may be provided on this length by moulding a band of plastic material across the teeth and tapes. Subsequently the two fasteners will be separated by cutting through the band.

The continuous tapes can ultimately be cut into lengths each cut passing through a band of plastic (when two adjacent stops are moulded on one piece of band) or between adjacent stops.

The invention is particularly intended for use with fasteners of the kind in which the teeth are provided by continuous lengths of filament, for example nylon filament formed into a spiral.

Examples of the method according to the invention will now be described with reference to the accompanying drawings in which Figures 1 to 6 and Figure 8 are plan views of continuous toothed tapes or of portions thereof at different stages in the method.

Figure 1 shows the tapes after cutting apertures according to one example of the method.

Figure 2 shows a part of the tapes after mounting a slider.

Figure 3 shows a part of the tapes after securing plastic material.

Figure 4 shows the tapes in the first stage of a second example of the method.

Figure 5 shows a part of the tapes after cutting apertures.

Figure 6 shows a part of the tapes after mounting a slider.

Figure 7 is a longitudinal sectional elevation of a top stop and part of the tapes.

Figure 8 is a plan view of a part of the tapes at an intermediate stage in a third example of the process.

Referring now to Figures 1 to 3 tapes 1 provided with series of teeth 2, formed from continuous nylon filament (not shown in detail) are assembled in continuous lengths with the teeth engaged. Rectangular apertures 3 are cut from the teeth and tapes at intervals equal to the length of individual fasteners to be manufactured and a slider 4 is inserted into each aperture and mounted on to the engaged teeth thus partly disengaging them near to the top of a fastener (as shown in Figure 2). Strips of plastic material 5 are then moulded to the tape on the upper and under surfaces at the open top 6 of the one fastener 7 and at the closed bottom 8 of adjacent fastener 9 (Figure 3). In the same moulding operation, top stops 10 and bottom stop 11 are formed and completed fasteners are separated by cutting along the lines 12 and 13.

A second example of the method is illustrated in Figures 4 to 7. Wide bands of plastic material 20 are moulded transversally on to the upper and under surfaces of the continuous toothed tapes 1, at intervals equal to the length of individual fasteners to be manufactured. In the same moulding operation top stops 21 and bottom stops 22 are formed. Rectangular apertures 23 are subsequently cut (Figure 5). The top end of fastener 24 (Figure 6) is split longitudinally and a slider 25 is inserted into the aperture 23 and mounted on the teeth 2 of fastener 24 by sliding over the previously formed top stops 21. A sectional detail of the top stops 21 is represented in Figure 7. The top stops are wedge-shaped with the thin ends of the wedge directed towards the aperture 23 so as to permit the slider 25 to ride down on to the teeth 2 but to prevent it from being removed in the other upward direction. A certain degree of resilience in the material from which the top stop is made is desirable for this to be possible. Completed fasteners are then separated by cutting through the plastic material as required.

A third modification of the method is illustrated in Figure 8 which represents an intermediate stage. Apertures 33 are cut at intervals equal to the length of two individual fasteners to be manufactured and two sliders 34 are inserted into each aperture head-to-head and mounted on the teeth of adjacent fasteners. Top stops are then formed on opposite sides of the same aperture and bottom stops at an intermediate position between apertures. Individual fasteners after completion are separated by cutting between adjacent top stops and adjacent bottom stops. This modification of the method may be employed in conjunction with either of the first two examples described.

Using the method of our invention slide fasteners may be manufactured in long continuous lengths and cut off or separated as required. Starting from continuous toothed tapes which may be stored in rolls, fasteners of varying lengths may be manufactured rapidly and at short notice with the minimum sacrifice of continuity.

The claims defining the invention are as follows:

1. A method of manufacturing slide fasteners of the kind referred to which comprises assembling continuous toothed tapes together with the teeth engaged, cutting apertures in the assembled tapes at each of a number of positions along the tapes, each aperture extending over a number of the engaged teeth and being large enough to permit a slider to be inserted therein, inserting at least one slider in each aperture and mounting same on the teeth and securing plastic material to the tape in the vicinity of the apertures either before the said aperture-cutting or after mounting of the slider. (16th March, 1961).

2. A method as claimed in claim 1 comprising the additional step of forming or securing end stops on the fastener. (16th March, 1961).

3. A method as claimed in claim 2 inwhich the plastic material is secured to the tape after mounting of the slider and the end stops are formed from the plastic material either simultaneously or in a subsequent operation. (16th March, 1961).

4. A method as claimed in claim 2 in which the plastic material is secured to the tape before cutting and at least the top stops are formed or secured on the fasteners after mounting of the slider. (16th March, 1961).

5. A method as claimed in claim 2 in which the plastic material is secured to the tape and the top stops are formed or secured on the fasteners before cutting, the said top stops permitting mounting of the slider on the fasteners over the end stops in the one direction but preventing removal of the sliders in the other direction. (16th March, 1961).

6. A method as claimed in claim 5 in which the top stops are of resilient material and are wedge-shaped, the thin end of the wedge being directed towards the aperture. (16th March, 1961).

7. A method as claimed in any one of claims 2 to 6 in which the plastic material is in the form of a transverse band forming the end stops and preventing fraying of the cut tape. (16th March, 1961).

8. A method as claimed in any one of claims 1 to 7 in which the apertures are spaced along the tape at intervals equal to the length of the fasteners to be manufactured and one slider is inserted in each aperture. (16th March, 1961)

9. A method as claimed in any one of claims 1 to 7 in which the apertures are spaced along the tape at intervals equal to the lengths of two fasteners and two sliders are inserted in each aperture head-to-head so as to provide fasteners in pairs lying top-to-top. (16th March, 1961).

10. A method of manufacturing slide fasteners substantially as described with reference to and as shown in Figures 1 to 3. (16th March, 1961).

11. A method of manufacturing slide fasteners substantially as described with reference to Figures 4 to 7. (16th March, 1961).

12. A method of manufacturing slide fasteners substantially as described with reference to Figure 8. (16th March, 1961).

13. Slide fasteners when made by a method as claimed in any of the preceding claims. (16th March, 1961).

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Patent Attorneys for Applicant.

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Related Art:

Serial No.	Application No.	Classification.
-	3523/61	43.9
235,219	45,136/59	43.9
223,284	33,088/57	43.9.

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A. J. Arthur, Commonwealth Government Printer, Canberra.

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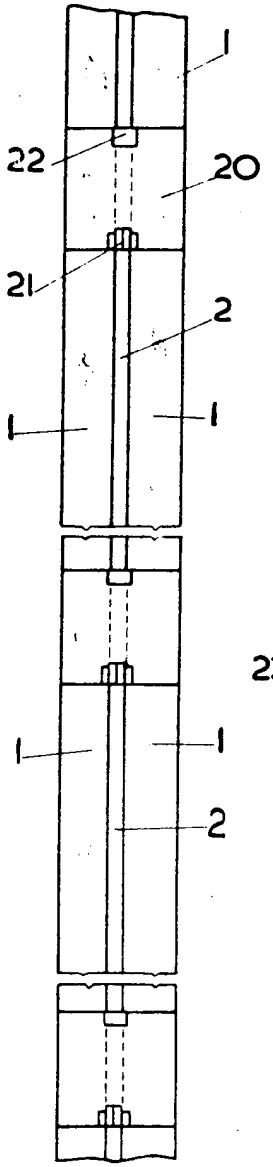

FIG.4.

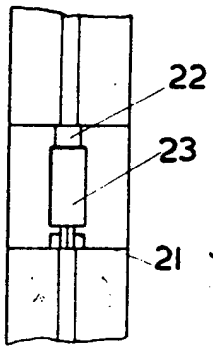

FIG. 5.

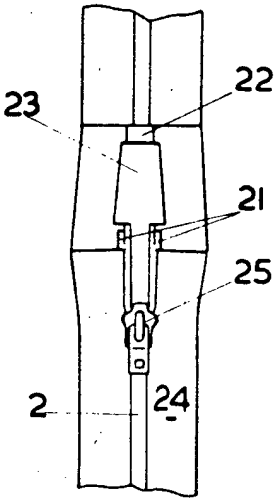

FIG. 6.

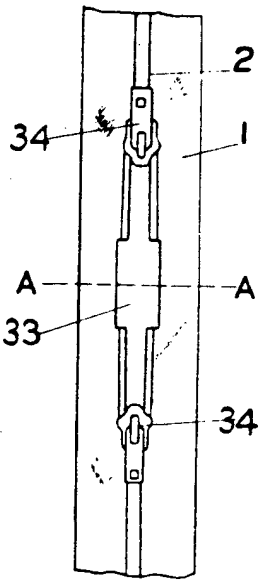

FIG. 8.

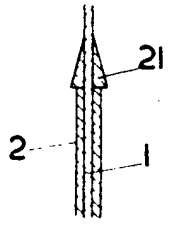

FIG. 7

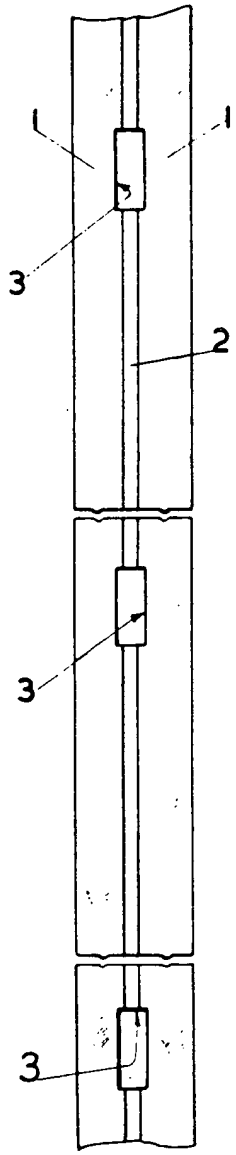

FIG. 1.

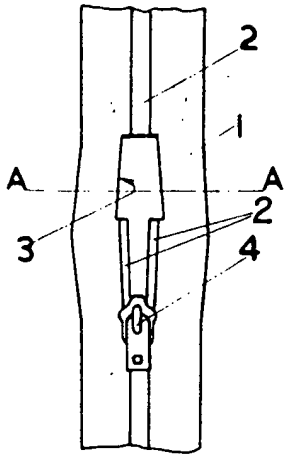

FIG. 2.

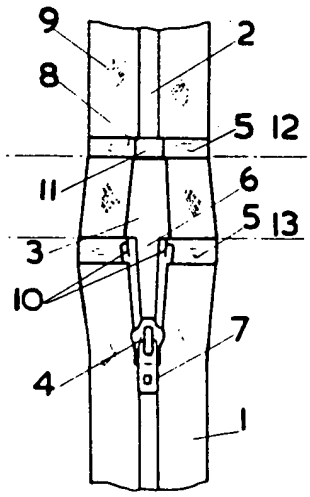

FIG. 3.